UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
LAMARRE, GUY J

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 03/18/2004

12

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _10 February 2004_.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-6_ is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-6_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10 February 2004_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☐ All b)☐ Some * c)☐ None of:

  1.☐ Certified copies of the priority documents have been received.

  2.☐ Certified copies of the priority documents have been received in Application No. _____.

  3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.1   Objections to the drawings and specifications not stated below have been met and therefore withdrawn.

1.2   Claims 1-6 are now pending.

1.3   The new declaration has been found to be free of the deficiencies as stated in the prior office action. Specifically, the signatures and dates are both present and legible.

Drawings

2.1   The drawings are objected to because Figure 2 lacks significant labeling for the X- and Y-axes. Specifically, while it is clear that the axes are the vertical and horizontal lines along the drawing, it is not clear as to what the numbers along the axes represent. (See applicant's figures 3 and 4 where the labels are "Normalized Amplitude" and "Location (SYM)")

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3.1   The disclosure is objected to because of the following informalities: the phrase " and – 90 degree phase" on line9 of page 2 should apparently be "and a –90 degree phase."

3.2   The disclosure is objected to because of the following informalities: the meaning of the phrase "matched filter correlators" on line 3 of page 4 is unclear. While the term may be fully discussed in the cited reference on page 4, lines 4 and 5, the examiner does not have a copy of the reference and therefore is unable to determine the meaning of the phrase. If applicant is to rely on cited references to help describe and/or define phrases, actions, or devices, copies of the relied upon cited references should be provided.

3.3   The disclosure is objected to because of the following informalities: the word "a" is apparently missing in the phrase "in (a) similar" on line 2 of page 7.

3.4   The disclosure is objected to because of the following informalities: a description of what β_i represents is not given. While it is noted that the equation on page 6 "defines" the term β_i, the actual meaning (i.e. what the term represents) is not given/defined. The examiner notes that what the term represents is implied (the examiner sees the term as representing normalized average noise power to the duration of the preamble) but should be clearly stated so as to remove doubt and/or confusion as to what it represents.

Appropriate corrections are required.

Claim Objections

4.1   Claim 4 is objected to because of the following informalities: the word "are" in the phrase "subpreamble are have" is apparently unnecessary.

Appropriate correction is required.

Response to Arguments

5.1   Applicant's arguments filed 10 February 2004 have been fully considered but

they are not persuasive.

Applicant argues, on page 7 of the remarks, that "providing a data packet having

a framing format including a preamble split into a plurality of subpreambles of non-

interleaved symbols" is neither taught nor suggested by any of the applied references

(d1r4 or ballot 2) either alone or in the total combination as claimed. D1r4 however, on

lines 51-56 of page 51 and lines 1-2 of page 52 substantially teaches of inserting

preamble symbols "every v= ... symbols starting from the first symbol. Preamble

symbols are located at locations 0, v, 2v, 3v, ... (1st symbol of the packet is at location

0)." By doing so, d1r4 is creating data packets with the option of splitting the preamble

into a plurality of preamble bits. On lines 4 and 5 of page 52, d1r4 shows an example of

a split and separated preamble type of data packet, with P representing preamble bits

and D representing data bits: P D D D D P D D D D P D D D D P D. The examiner has

interpreted lines 51-56 of page 51 and lines 1-2 of page 52 of d1r4 to teach that since

the preamble is placed every v symbols, that the preamble is split into sub-preambles

separated by v data symbols. Further, the examiner has interpreted lines 4 and 5 of

page 52 of d1r4 to explicitly show a preamble, P, split into 4 sub preambles, separated

by 4 data symbols, D.

Further, Ballot 2 explicitly teaches of, on page 22, a preamble being split into two

parts (i.e. clearly 2 is in the realm of plurality, i.e. more than 1). As per the amended

limitation of being non-interleaved symbols, Ballot 2 further explicitly teaches of

suggesting to add a split preamble mode to the existing interleaved/non-interleaved modes. The examiner is interpreting this to mean that the preamble could be either interleaved or non-interleaved and then split as well, thereby meeting the limitation of having non-interleaved symbols.

Applicant further argues that the parameter β sub i with specific variables, T sub i and Φ sub i, is neither taught nor suggested either alone or in combination as claimed in any of the applied references as well as not shown in any proper combination of the applied references. Mathworld, however teaches of an equation to calculate the average power of a signal. While not being mathematically equivalent, the two equations however are not patentably distinct from one another. While the claimed equation while normalizing the noise power to the duration of the preamble, it nonetheless, as read and interpreted by the examiner, simply calculates the noise power of a signal for a specified time period. The equation, as taught by Mathworld, similarly teaches of calculating the noise power of a signal for a specified time period. Since both are functionally equivalent and both produce the noise power of a signal for a specified time period, they are not seen as patentably distinct equations.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

As per applicant's claim that there is no motivation to combine the applied references, Ballot 2 teaches of reasons as to why a preamble should be split. On page 22, Ballot 2 teaches to help increase acquisition robustness against impulse noise. The examiner is interpreting this to suggest that noise is a problem when acquiring the preamble, which the applicant's specifications, page 3, lines 3-5, teach as a synchronization tool. If the preamble is not received and decoded correctly, then correct synchronization is not achieved. With this in mind, it would have been obvious to one of ordinary skill in the art to want to measure the received noise power of a signal for a specified time period (i.e. preamble receiving time period) so as to be able to measure which of the sub preambles were received with less noise power. Clearly, since Ballot 2 teaches of trying to increase robustness against noise, noise power is an unwanted characteristic of a signal. When receiving the sub preambles, it would have therefore been obvious to one of ordinary skill to choose the sub preamble (or any other piece of data) with the least amount of relative noise.

Applicant further argues that determining sync using correlation with a priori known symbols using the subpreamble or combined subpreamble with the lowest Beta is not taught nor suggested either alone or in the combination as claimed in any of the applied references as well as not shown in any proper combination of the applied references. The Applicant's specifications teach, as admitted prior on page 3 lines 5-20

and also as located in US Patent No 5,289,476, that a preamble is often used as a sync

tool and is a sequence of a priori known symbols. Since d1r4, see page 51 lines 28-31,

ballot 2, see page 22, and applicant's admitted prior art, see page 3 lines 10-20 all

teach of noise affecting the correct receiving/decoding of signals, it therefore would

have been further obvious to one of ordinary skill to a) determine which if any of the

preambles (or any data in general) has been affected by noise (i.e. what Beta is a

measure of) and b) to use/accept the preamble (or any data in general) that has been

the least (or not at all) affected by noise (i.e. what Beta is a measure of) as the

preamble to use to detect sync. Since all of the cited and used references teach of the

affect of noise on a signal and the necessity of acquiring sync, one of ordinary skill

would have obviously chosen a preamble (or any data) that has been the least affected

by noise (equivalent to having the lowest Beta value, which is itself equivalent to a

signal that contains the least amount of noise power) to attempt to achieve the most

reliable sync information.

Claim Rejections - 35 USC § 103

6.1   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.2   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6.3   Claims 1-4 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over IEEE 802.14a High-Capacity Physical Layer Specification Draft 1 Revision 4 (herein after d1r4) in view of 802.14a Sub-Working Group's Ballot Decision 2 file (hereinafter Ballot 2) and Mathworld's Average Power webpage (hereinafter Mathworld).

<u>As per claim 1,</u>

In lines 51-56 of page 51 and lines 1-2 of page 52, D1r4 substantially teaches of inserting the preamble symbols "every v= ... symbols starting from the first symbol. Preamble symbols are located at locations 0, v, 2v, 3v, ... (1st symbol of the packet is at location 0)." By doing so, d1r4 is creating data packets with the option of splitting the preamble into a plurality of preamble bits. On lines 4 and 5 of page 52, d1r4 shows an example of a split and separated preamble type of data packet, with P representing preamble bits and D representing data bits:

P D D D D P D D D D P D D D D P D

D1r4 does not specifically teach that the splitting of the preamble is used to help aid the acquiring of packet synchronization or of specifically calculating the average power noise power during transmission normalized to the length of the preamble.

Ballot 2, however, does teach that adding a split preamble mode (in addition to the interleaved/non-interleaved modes) would increase acquisition robustness against impulse noise (see page 22, item 4 under 4.2.11 heading). Ballot 2 goes on to teach that in the split preamble mode, the preamble will be split into two parts. The first part will be added before the data, and the second part will be inserted after a predefined number of data symbols (see pages 22 + 23, item 4 under 4.2.11 heading).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the split preamble mode of Ballot 2 to the teachings of D1r4 so that one would be able to increase acquisition robustness against impulse noise. One would be motivated to do this so as to allow the preamble section of the packet to be affected by noise and still be able to acquire synchronization. Since the noise, presumably, would not be able to affect both subpreambles, one subpreamble will have to able to provide synchronization. Also, ballot 2 is in fact a file of suggested changes and/or corrections to a draft of the High-Capacity Physical Layer Specification (d1r4 is simply draft 1, revision 4 of the High-Capacity Physical Layer Specification) and the splitting of the preamble was therefore was suggested to be included into that specification.

It also would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the splitting of the preamble from two to many subpreambles. One skilled in the art would do this to create more opportunities to receive a subpreamble that was not affected by noise. By doing so, one skilled in the

art would increase the likelihood of being able to successfully acquire synchronization by choosing from one of a plurality of correctly received subpreambles.

Mathworld teaches of an equation to calculate the average power of a signal. The claimed equation for β is non-patentably distinct from the equation described in Mathworld. The only difference is that the claimed equation for β is normalized to the duration of the preamble. Slight modification is done to Applicant's equation so as to normalize the average noise power to the duration of the preamble. Even with the modification, the output of the Applicant's equation still yields the average power of an inputted signal, as does Mathworld's equation.

It would have been obvious to one skilled in the art at the time the invention was made to use an equation, such as the one described by Mathworld, to determine how much noise was affecting the preamble transmission. As above, since the purpose of splitting the preamble was to increase robustness against impulse noise, one skilled in the art would want to choose the preamble or subpreamble that has been affected by the least amount of noise to acquire synchronization successfully. Since noise generally causes errors in the transmitted data, choosing the preamble or subpreamble affected by the least amount of noise (and having the highest effective SNR), chooses the preamble or subpreamble with the least errors and therefore will most likely acquire the correct synchronization. One skilled in the art would want to choose the preamble or subpreamble affected by the least amount of noise so as to have a better chance of acquiring the correct synchronization.

As per claim 2,

Ballot 2 further teaches of having 2 subpreambles (i.e. preamble being split into 2

parts), see page 22, and of the preambles being separated by symbols, see top of page

23.

As per claim 3,

Ballot 2 further teaches of having data symbols separating the two preambles,

bottom of page 22 to top of page 23.

D1r4 further teaches of symbols being added before the preamble is prepended,

see figure 4-14 on page 27. In this figure, it shows of symbols other than data symbols

being used to form the packet. Notably, the scrambling sequence as well as zero

padding are both a priori known symbols (i.e. known before hand).

6.4   Claims 4-6 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over

IEEE 802.14a High-Capacity Physical Layer Specification Draft 1 Revision 4 (herein

after d1r4) in view of 802.14a Sub-Working Group's Ballot Decision 2 file (hereinafter

Ballot 2) and admitted prior art 'Specifications' (hereinafter Specs).

As per claim 4,

D1r4 substantially teaches, on lines 51-56 of page 51 and lines 1-2 of page 52 of

inserting preamble symbols "every v= ... symbols starting from the first symbol.

Preamble symbols are located at locations 0, v, 2v, 3v, ... (1st symbol of the packet is at

location 0)." By doing so, d1r4 is creating data packets with the option of splitting the

preamble into a plurality of preamble bits. On lines 4 and 5 of page 52, d1r4 shows an

example of a split and separated preamble type of data packet, with P representing

preamble bits and D representing data bits: P D D D D P D D D D P D D D D P D. The

examiner has interpreted lines 51-56 of page 51 and lines 1-2 of page 52 of d1r4 to teach that since the preamble is placed every v symbols, that the preamble is split into sub-preambles separated by v data symbols. Further, the examiner has interpreted lines 4 and 5 of page 52 of d1r4 to explicitly show a preamble, P, split into 4 sub preambles, separated by 4 data symbols, D.

D1r4 does not explicitly teach of determining if any of the subpreambles have been affected by noise or of determining sync using the subpreambles of which have not been affected by noise. Nonetheless, d1r4 does teach of interleaving (i.e. splitting) bits to randomize the noise in the channel, see page 51 lines 28-31. The examiner is interpreting this to mean that d1r4 is interleaving/splitting data up to lessen the affect of noise on the signals.

Ballot 2, on page 22 teaches of suggestions on how to increase acquisition robustness against noise power. Ballot 2 suggests to split the preamble to accomplish this. Further, since noise power is considered detrimental to a received preamble (or any data for that matter) it is clear that less noise power in a received signal is better than when there is a large amount of noise power. Applicant's specifications (admitted prior art) teaches on page 3, lines 3-5, that the preamble is used as a synchronization tool.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the idea of acquisition robustness and of using the preamble as a sync tool into the teachings of d1r4 so as to create a more noise resistant sync acquiring transmission method. One of ordinary skill in the art would

have been motivated to enhance the acquisition robustness of d1r4 by the teachings of

ballot 2 because d1r4 already teaches that interleaving (i.e. splitting data up) helps

lessen the effect of noise on signals and also by the fact that ballot 2 is a file of

suggested changes and/or corrections to d1r4. Further, one of ordinary skill in the art

would have been further motivated to include the teachings of Specs to the previous

combination of d1r4 and ballot 2 because the preamble, as Specs teaches as prior from

US Patent 5,289,476, is used as a sync tool. One of ordinary skill in the art would know

that preambles are used as sync tools and it therefore would have been an obvious step

to use the preamble as a sync tool.

Further, since d1r4, see page 51 lines 28-31, ballot 2, see page 22, and Specs,

see page 3 lines 10-20 all teach of noise affecting the correct receiving/decoding of

signals, it therefore would have been further obvious to one of ordinary skill to a)

determine which if any of the preambles (or any data in general) has been affected by

noise and b) to use/accept the preamble (or any data in general) that has been least (or

not at all) affected by noise as the preamble to use to detect sync. Since all of the cited

and used references teach of the affect of noise on a signal and the necessity of

acquiring sync, one of ordinary skill would have obviously chosen a preamble (or any

data) that has been the least affected by noise to attempt to achieve the most reliable

sync information.

As per claim 5,

Ballot 2 further teaches of having 2 subpreambles (i.e. preamble being split into 2

parts), see page 22, and of the preambles being separated by symbols, see top of page

23.

As per claim 6,

Ballot 2 further teaches of having data symbols separating the two preambles,

bottom of page 22 to top of page 23.

D1r4 further teaches of symbols being added before the preamble is prepended,

see figure 4-14 on page 27. In this figure, it shows of symbols other than data symbols

being used to form the packet. Notably, the scrambling sequence as well as zero

padding are both a priori known symbols (i.e. known before hand).

Conclusion

7.1   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7.2   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guy J. Lamarre, P.E., whose telephone number is (703) 305-0755. The examiner can normally be reached on Monday to Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Guy J. Lamarre, P.E
Patent Examiner
3/15/04